

ABSTRACT OF THE DISCLOSURE

The thermal process for treating a metal to improve structural characteristics of the metal entails placing a metal within a thermal control apparatus; introducing a cryogenic material into the thermal control apparatus to decrease the metal temperature, while preventing over-stressing of

5 the metal, to a first target temperature ranging from -40 degrees F and -380 degrees F at a first temperature rate ranging from 0.25 degrees per minute and 20 degrees per minute; stopping the introduction of the cryogenic material once the first target temperature is reached; increasing the chamber temperature to a second target temperature ranging from 0 degrees F and 1400 degrees F; and increasing the metal temperature to the second target temperature at a second temperature

10 rate ranging from 0.25 degrees per minute and 20 degrees per minute, resulting in a treated metal without fractures.